## CLAIMS

What is claimed is:

1. A method for etching a high aspect ratio feature through a mask into a layer to be etched over a substrate, comprising:

placing the substrate in a process chamber, which is able to provide RF power at a first frequency, a second frequency different than the first frequency, and a third frequency different than the first and second frequency;

providing an etchant gas to the process chamber;

providing a first etch step where the first frequency is at a first power level, the second frequency is at a second power level, and the third frequency is at a third power level, wherein the first power and at least one of the second or the third power are greater than zero, wherein the first etch etches a feature in the layer to be etched to a first depth; and

providing a second etch step where the first frequency is at a fourth power level, the second frequency is at a fifth power level, and the third frequency is at a sixth power level, wherein at least one of the fourth and sixth powers is greater than zero and the fifth power is greater than zero, and wherein a condition is selected from the group of the first power not being equal to the fourth power and the third power not being equal to the sixth power, wherein the second etch etches the feature in the layer to be etched to a second depth greater than the first depth.

2. The method, as recited in claim 1, wherein the layer to be etched is a dielectric layer.

3. The method, as recited in claim 2, wherein the dielectric layer is a single layer.

4. The method, as recited in claim 3, wherein the single layer is a uniform layer.

5. The method, as recited in claim 4, further comprising a third etch step, wherein at least two of the seventh, eighth, and ninth powers is greater than zero and where a condition is selected from the group of the seventh power not being equal to the fourth power, the eighth power not being equal to the fifth power, and the ninth power not being equal to the sixth power, wherein the third etch etches the feature in the dielectric layer to a third depth greater than the second depth.

6. The method, as recited in claim 5, wherein the first frequency is between 100 kHz and 10 MHz, the second frequency is between 10 MHz to about 35 MHz, and the third frequency is greater than 40 MHz.

7. The method, as recited in claim 5, wherein the first frequency is about 2 MHz, the second frequency is about 27 MHz, and the third frequency is about 60 MHz.

8. The method, as recited in claim 5, wherein the etchant gas comprises a component gas selected from the group of a fluorocarbon and a hydrofluorocarbon.

9. The method, as recited in claim 1, further comprising a third etch step, wherein at least two of the seventh, eighth, and ninth powers is greater than zero and where a condition is selected from the group of the seventh power not being equal to the fourth power, the eighth power not being equal to the fifth power, and the ninth power not being equal to the sixth power, wherein the third etch etches the feature in the dielectric layer to a third depth greater than the second depth.

10. The method, as recited in claim 9, wherein the first frequency is between 100 kHz and 10 MHz, the second frequency is between 10 MHz to about 35 MHz, and the third frequency is greater than 40 MHz.

11. A semiconductor device formed by the method of claim 1.

12. A method for etching a high aspect ratio feature in a dielectric layer over a substrate, comprising:

placing the substrate in a process chamber, which is able to provide RF power at a first frequency, a second frequency different than the first frequency, and a third frequency different than the first and second frequencies;

providing an etchant gas to the process chamber;

providing a first etch step using the first frequency, the second frequency, and the third frequency to etch a feature into the etch layer to a first depth;

providing a second etch using the first frequency, the second frequency, and the third frequency, with at least one of the frequencies at a different power level than that used in the first etch to etch the feature in the etch layer to a second depth greater than the first depth; and

providing a third etch using the first frequency, the second frequency, and the third frequency, with at least one of the frequencies at a different power level than that used in the second etch, to etch the feature into the etch layer to a third depth greater than the second depth.

13. The method, as recited in claim 12, wherein the layer to be etched is a dielectric layer.

14. The method, as recited in claim 13, wherein the dielectric layer is a single layer.

15. The method, as recited in claim 14, wherein the single layer is a uniform layer.

16. The method, as recited in claim 12, wherein the first frequency is between 100 kHz and 10 MHz, the second frequency is between 10 MHz to about 35 MHz, and the third frequency is greater than 40 MHz.

17. An apparatus for etching a feature in an etch layer through a mask over a substrate, comprising:

a plasma processing chamber, comprising:

a chamber wall forming a plasma processing chamber enclosure;

a substrate support for supporting a substrate within the plasma processing chamber enclosure;

a pressure regulator for regulating the pressure in the plasma processing chamber enclosure;

at least one electrode for providing power to the plasma processing chamber enclosure for sustaining a plasma;

a gas inlet for providing gas into the plasma processing chamber enclosure; and

a gas outlet for exhausting gas from the plasma processing chamber enclosure;

a gas source in fluid connection with the gas inlet,

a first power source for providing power within the chamber wall at a first frequency;

a second power source for providing power within the chamber wall at a second frequency different than the first frequency;

a third power source for providing power within the chamber wall at a third frequency different than the first frequency and the second frequency; and

a controller controllably connected to the gas inlet, the first power source, the second power source, and the third power source, comprising:

at least one processor; and

computer readable media, comprising:

computer readable code for introducing an etchant gas through the gas inlet;

computer readable code for performing a first etch step, comprising:

providing energy from the first power source at a first power level;

providing energy from the second power source at a second power level;

providing energy from the third power source at a third power level, wherein in the first power level and the third power level are greater than zero, wherein the first etch is used to etch a feature in the layer to be etched to a first depth; and

computer readable code for performing a second etch step, comprising:

providing energy from the first power source at a fourth power level;

providing energy from the second power source at a fifth power level;

providing energy from the third power source at a sixth power level, wherein in the first power level and the third power level are greater than zero, wherein the first etch is used to etch a feature in the layer to be etched to a first depth, wherein at least one of the fourth and sixth power levels is greater than zero and the fifth power level is greater than zero, and wherein a condition is selected from the group of the first power level not being equal to the fourth power level and the third power level not being equal to the sixth power level, wherein the second etch etches the feature in the layer to be etched to a second depth greater than the first depth.

18. The apparatus, as recited in claim 17, wherein the first frequency is between 100 kHz and 10 MHz, the second frequency is between 10 MHz to about 35 MHz, and the third frequency is greater than 40 MHz.